

REMARKS

Applicant has reviewed the Office Action mailed on July 28, 2003, as well as the art cited. Applicant has added claims 34-36. Claims 1-36 are pending in this application.

Information Disclosure Statement

Applicant respectfully requests that copies of the 1449 forms, listing all references that were submitted with the Information Disclosure Statements filed on July 30, 2003 and November 20, 2002, marked as being considered and initialed by the Examiner, be returned with the next official communication.

Rejections Under 35 U.S.C. § 102

Claims 26, 27 and 29-33 were rejected under 35 USC § 102(a) as being anticipated by Gorman, (WO 99/30449). Applicant respectfully traverses this rejection.

Claim 26 reads as follows:

A system, comprising:

- a head end;
- at least one optical distribution node, coupled to the head end over an optical fiber, the optical distribution node adapted to convert between optical and electrical signals;
- a distribution network, including at least one coaxial cable, coupled to the at least one optical distribution node, and providing connection for subscriber equipment; and
- wherein the head end includes a multi-channel cable modem termination system that supports multiple downstream channels and multiple upstream channels on a common coaxial cable.

The Examiner asserts that Gorman discloses that the cable modem termination system supports "multiple downstream channels and multiple upstream channels." Applicant has amended claim 26 to clarify that the claimed system includes a cable modem termination system in which "multiple downstream and multiple upstream channels are *supported on a common coaxial cable*." (Emphasis added). Applicant has thoroughly reviewed Gorman and respectfully asserts that Gorman does not or suggest supporting multiple upstream channels on a common coaxial cable. Rather, Gorman appears to show a one-to-one (e.g., Fig. 3) or a many-to-one (e.g.,

Figs. 7 and 8) relationship between upstream ports and upstream channels. *See, e.g.,* Figures 3, 7 and 8 of Gorman and the accompanying description. In the claimed system, the relationship between upstream ports (coaxial cables) and upstream channels is one-to-many. This means that one coaxial cable can provide increased bandwidth to subscribers by supporting multiple upstream channels on the same cable. Gorman is concerned with the opposite problem: how to limit the number of receivers needed to support a small number of subscribers on multiple coaxial cables. Therefore, claim 26 is not anticipated nor obvious in light of Gorman.

2) Claim 27 depends from and adds other limitations to claim 26. Specifically, claim 26 adds that the MAC circuits support N contiguous downstream channels with a single upconverter. The Examiner asserts that this limitation is met by the description in Gorman of transmitting unicast packets. Applicant respectfully traverses this assertion. Gorman is clear what is meant by a "downstream channel." The definition is written in terms of frequency bandwidth, not time slots. Therefore, the transmission of unicast packets over a common frequency band does not meet the limitation of N contiguous downstream channels. *See, Gorman, p. 10, lines 21-23.* Claim 27 is also not anticipated nor obvious in light of the cited art.

Claims 29-32 depend indirectly from claim 26 and thus are also patentable for the reasons discussed above with respect to claim 26 and for the additional limitations of these claims.

3) Claim 33 depends directly from claim 31 and indirectly from claim 26, and adds the limitation that there is a splitter associated with the upstream port. The Examiner asserts that the reverse path multiplexer of Fig. 9 of Gorman meets this limitation. Applicant respectfully traverses this assertion. The reverse path multiplexer of Gorman receives inputs from many ports, e.g., cables, and directs this to an upstream port of a receiver card. This is the opposite of splitting. Splitting is taking a signal and dividing it up and sending it to two or more different destinations. Therefore, claim 33 is not anticipated nor obvious in light of the art.

Rejections Under 35 U.S.C. § 103

Claims 1, 2, 5 and 6 were rejected under 35 USC § 103(a) as being unpatentable over Chapman, "Multimedia Traffic Engineering for HFC Networks, A White Paper on Data, Voice

and Video Over IP", Cisco Systems, December 1999, pgs. 1-75, (hereinafter the White Paper) in view of Bigband Networks (WO 00/72509).

Claim 1 reads as follows:

A circuit for a cable modem termination system, the circuit comprising:
a backplane interface;
a packet processing engine coupled to the backplane interface; and
a plurality of media access control (MAC) circuits, each media access control circuit coupled to the packet processing engine, each MAC circuit supporting one of N contiguous downstream channels with a single upconverter and each MAC circuit also supporting a plurality of upstream channels.

X) The Examiner asserts that the White Paper discloses the claimed N contiguous downstream channels with a single upconverter because the White Paper says that a CMTS may have its downstreams on one card and its upstreams on another card. Applicant respectfully traverses this rejection. There is nothing in the White Paper that discusses the location of the downstream spectrum nor is there any indication of how the downstreams are modulated or transmitted. This limitation is also not taught or suggested by Bigband Networks. The cited references, alone or in combination, fail to teach or suggest the limitations of claim 1 and claim 1 is, thus, not obvious in light of the cited references.

Claims 2, 5, and 6 depend, directly or indirectly from claim 1, and thus are also patentable for the reasons identified with respect to claim 1 and for the additional limitations in the claims.

Claims 1-25 were rejected under 35 USC § 103(a) as being unpatentable over Gorman (WO 99/30449) in view of Bigband Networks (WO 00/72509).

Claim 1

Claim 1 reads as follows:

A circuit for a cable modem termination system, the circuit comprising:
a backplane interface;
a packet processing engine coupled to the backplane interface; and
a plurality of media access control (MAC) circuits, each media access control circuit coupled to the packet processing engine, each MAC circuit supporting one of N contiguous downstream channels with a single upconverter and each MAC circuit also supporting a plurality of upstream channels.

4) The Examiner asserts that the combination of Gorman and Bigband Networks teaches the use of N contiguous downstream channels with a single upconverter as called for in claim 1. The Examiner, however, fails to show where the references, alone or in combination, teach or suggest the use of N contiguous downstream channels and a single upconverter. The Examiner simply notes that Bigband Networks shows a plurality of modulators and then concludes that it would have been obvious to use a combiner and a single upconverter to upconvert the downstream channels into a plurality of contiguous frequency bands. The Examiner has provided no evidence to connect the teachings of the references with his conclusion on obviousness. Applicant respectfully asserts that this gap in the Examiner's rejection is not filled by the references, alone or in combination, and thus claim 1 is not obvious in light of the cited art.

Claims 2-7 depend, directly or indirectly from claim 1, and as such are allowable due to the patentable limitations of claim 1 and the further limitations added by these claims.

Claim 8

8. (Original) A circuit for a cable modem termination system, the circuit comprising:

- a downstream port;
- a plurality of upstream ports;
- a backplane interface;
- a packet processing engine coupled to the backplane interface;
- a plurality of media access control (MAC) circuits, each media access control circuit coupled to the packet processing engine;
- a downstream signal path that supports a plurality of downstream channels, the downstream signal path comprising:
 - a plurality of downstream modulators, each coupled to a corresponding one of the MAC circuits to provide one of the downstream channels;
 - a combiner, coupled to the plurality of downstream modulators, that is adapted to combine the plurality of downstream channels; and
 - an upconverter, coupled to the combiner and the downstream port, the combiner adapted to upconvert the downstream channels into a plurality of contiguous frequency bands; and
- a plurality of upstream signal paths, each signal path including:
 - a splitter, coupled to one of the plurality of upstream ports, that is adapted to separate out a plurality of upstream channels;

a plurality of receivers, each coupled to an output of the splitter;
and
a plurality of demodulators, each demodulator coupled to one of
the receivers and a different one of the MAC circuits.

The Examiner asserts that Gorman teaches MAC circuits that transmit "a plurality of downstream channels" based on the transmission of "unicast" packets. As discussed above, Gorman does not teach or suggest this limitation. Further, the Examiner asserts that the reverse path multiplexer is a splitter as called for in the upstream signal path. Applicant respectfully traverses this assertion for the reasons described above. Finally, the Examiner asserts that it would have been obvious to combine the references to provide a plurality of contiguous downstream channels with a single upconverter. Applicant asserts, for the reasons identified above, that the proposed combination does not teach or suggest these limitations. Therefore, claim 8 is not obvious in light of the cited art.

Claims 9 and 10 depend, directly or indirectly from claim 8, and as such are allowable due to the patentable limitations of claim 8 and the further limitations added by these claims.

Claim 11

Claim 11 reads as follows:

11. (Original) A method for transmitting a plurality of data channels over a network from a single cable modem termination system, the method comprising:
separately modulating a plurality of downstream data channels;
combining the data channels to form a downstream signal; and
upconverting the downstream signal having the plurality of data channels with a single upconverter.

67 The Examiner provided no specific application of the art to claim 11. Applicant respectfully asserts that claim 11 is not obvious in light of the art because, as discussed above, the references alone or in combination, do not teach or suggest upconverting a plurality of downstream channels with a single upconverter.

Claims 12-14 depend, directly or indirectly from claim 11, and as such are allowable due to the patentable limitations of claim 11 and the further limitations added by these claims.

Claim 15

Claim 15 reads as follows:

15. (Original) A method for communicating data with a single cable modem termination system, the method comprising:
- in the downstream,
 - separately modulating a plurality of downstream data channels,
 - combining the data channels to form a downstream signal,
 - and
 - upconverting the downstream signal having the plurality of data channels with a single upconverter;
 - for each of a plurality of ports in the upstream,
 - separating out a plurality of upstream channels, and
 - separately downconverting and demodulating the upstream channels.

2) The Examiner provided no specific arguments with respect to claim 15. Applicant respectfully asserts that the cited references, alone or in combination, fail to teach or suggest upconverting a downstream signal having a plurality of data channels with a single upconverter. Further, the references fail to teach or suggest, for each upstream port, separating out a plurality of upstream channels and separately downconverting the upstream channels. Therefore, claim 15 is not obvious in view of the cited references.

Claims 16-18 depend, directly or indirectly from claim 15, and as such are allowable due to the patentable limitations of claim 15 and the further limitations added by these claims.

Claim 19

Claim 19 reads as follows:

19. (Original) A circuit for a cable modem termination system, the circuit comprising:
- a downstream port;
 - a plurality of upstream ports;
 - a packet processing engine;
 - a plurality of upstream data paths, coupled between the plurality of upstream ports and the packet processing engine;
 - a plurality of downstream data paths; and

a single, shared upconverter, communicatively coupled to the plurality of downstream data paths and the downstream port, the upconverter adapted to have a bandwidth that is sufficient to upconvert a plurality of contiguous downstream channels from the plurality of data paths.

The Examiner failed to provide any specific comments on claim 19. Applicant respectfully asserts that claim 19 is not obvious in view of the cited art because the cited art fails to teach or suggest a single, shared upconverter that is adapted to upconvert a plurality of contiguous downstream channels. Therefore, claim 19 is not obvious in light of the cited art.

Claims 20-25 depend, directly or indirectly from claim 19, and as such are allowable due to the patentable limitations of claim 19 and the further limitations added by these claims.

Claim 28 was rejected under 35 USC § 103(a) as being unpatentable over Gorman (WO 99/30449).

Claim 28 depends from claim 27 and includes the patentable limitations of claim 27. Therefore, claim 28 is also allowable.

Applicant reserves the right to swear behind any reference asserted as prior art under 35 USC §§102(a), 102(e), 102(a)/103, and 102(e)/103. Applicant's arguments with respect to the references are not to be considered an admission that any of the references qualifies as prior art for the claims of this application.

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Attorney Docket No. 100.165US01

Title: SUPPORTING MULTIPLE DATA CHANNELS IN A CABLE MODEM TERMINATION SYSTEM


CONCLUSION

Applicant respectfully submits that claims 1-36 are in condition for allowance and notification to that effect is earnestly requested. If necessary, please charge any additional fees or credit overpayments to Deposit Account No. 502432.

If the Examiner has any questions or concerns regarding this application, please contact the undersigned at (612) 332-4720.

Respectfully submitted,

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